

and automation and must be evaluated accordingly.

5.2. Stores Management Set Test Techniques

5.2.1. Stores Management Set Integration Ground Tests

5.2.1.1. Purpose

The purpose of this test is to measure the SMS firing pulse, release interval and physical interface compatibility with the host aircraft and to assess the effects that these parameters have upon the utility of the SMS.

5.2.1.2. General

The evaluator must ensure that the SMS will provide the proper signals to each store in accordance with the requirements of the store and the desires of the aircrew. These tests provide the required data to verify that these requirements and desires are met.

5.2.1.3. Instrumentation

Test kits/weapons simulators and electrical test equipment are required. The specific equipment is chosen to suit the SMS under test and the particular stores to be carried by the airplane.

5.2.1.4. Data Required

Record the fire pulse voltage, and current and duration for each discrete signal to be provided to the station for release and motor fire. Record the time difference between the arrival of the firing pulse at each station and the cockpit initiation of release. Document comments concerning the fit of the electrical interfaces with the test equipment couplers.

5.2.1.5. Procedure

Connect the weapon test kit and the electrical test equipment to the station(s) to be tested. Ensure that all stations to be tested report a store aboard (normally, hooks closed will accomplish this). Provide the SMS with an inventory corresponding to the test kits attached to each station. Input a desired interval between releases. Select the weapons or stations to be activated and command release of those stations. Repeat for all likely station and store combinations.

5.2.1.6. Data Analysis

The voltage, current and duration of each firing pulse must be sufficient to perform the intended function, i.e., release pulses should be able to fire CADs in the bomb racks, electrical fuzing pulses should be of the correct voltage and polarity and motor fire pulses should be of sufficient energy to start the intended rocket motor. Fire pulses should be sufficient and consistent regardless of the number of stations selected. Intervals between release pulses should be in accordance with that selected in the cockpit. Release pulses should arrive ONLY at those stations selected and in the correct order in accordance with an established protocol or an order which was available for selection in the cockpit. The time from the release command to the arrival of the fire pulse at the selected station(s) should be commensurate with the mission and intended stores to be employed. All couplers should fit snugly and without undue effort. Umbilicals should mate properly when using inert stores. Relate improper weapons commands to the likelihood of a hang-fire, inadvertently activating the wrong store, or a missed target as appropriate. Relate poor coupler and umbilical fits to the possibility of damaging the connector racks or stores.

5.2.1.7. Data Cards

A sample data card is presented as card 68.

CARD NUMBER _____

INTEGRATION GROUND TEST

STORE STATION	STORE SIMULATED	VOLTAGE (V)	CURRENT (A)	PULSE LENGTH (MSEC)	TIME OF ARRIVAL (MSEC)

REMARKS:

5.2.2. Preflight and Built-In-Tests

5.2.2.1. Purpose

The purpose of this test is to assess the suitability of the SMS preflight and turn on procedure and the BIT to quickly and easily bring the SMS system on line and insure an operational system.

5.2.2.2. General

As airplanes become more expensive, fewer and fewer will be available to accomplish each mission, amplifying the loss of individual airplanes to inflight failures. Quick, accurate ground preflight tests are essential to determine system status while repairs can still be performed. A quick response/alert time is also important and so these checks must be expeditious and must allow the operator to prepare for the mission with a minimum of distractions. Limited airplane availability also implies the need for quick turnarounds to send the same aircraft out for successive missions. This necessitates a very short preflight and turn on procedure that can be accomplished safely and thoroughly before a hurried combat mission. SMS systems have the added requirement that the modification of the store load initialization data must be easy and quick since the modification is typically necessitated by a rapid mission driven load modification or stores failure.

5.2.2.3. Instrumentation

A stop watch, data cards and stores and/or stores test sets to simulate stores are required for this test. A voice tape recorder is optional.

5.2.2.4. Data Required

Qualitative comments, time to complete the preflight/turn on, time to complete the BIT and time to store the load initialization data is required. A record of BIT indications is required. Note the effort required to alter the store load after initialization.

5.2.2.5. Procedure

Perform a normal system preflight and turn on before each test flight using the published system check list. Note the times for SMS stores initialization, the external and internal preflights and the total system preflight time up to the ready for operate indications.

Perform a preflight BIT, noting the total BIT time and indications. Note any correlation between the BIT indications and the SMSs operation. Perform a complete system check out of the failure indications. Make qualitative comments as appropriate.

5.2.2.6. Data Analysis and Presentation

The time and complexity of the preflight procedures listed in the operator's checklist and SMS turn on/timeout procedure should be related to the expected alert launch time requirements and the overall operator workload during the alert launch. The BIT times and the amount of operator interface required to perform the BIT should be assessed in the same scenario. Clarity of the BIT indications should be related to the cockpit environment. The BIT indications should be related to actual SMS degradation and verified by ground technicians. Erroneous BIT false alarms should be noted and related to the probability of unnecessarily missed sorties. The time and effort to perform a change in the store load initialization data should be related to the necessity to make real time changes in the mission and loads for the aircraft.

5.2.2.7. Data Cards

Sample data cards are presented as cards 69 and 70.